

Variable Flow Tail Water Recovery System Data Sheet

Landowner Name John Doe

Legal Description NE 1/4 Sec 26 T28N R50W

Address Somewhere

Farm # 1111 Tract # 9999

Western, NE 00000

Phone Number (308) 123-1234

Interested in Cost Share X Yes No

Designed By CES Date 12/01

Checked By AGE Date 12/01

Approved By CES Date 12/01

Existing Field Information

Total irrigated acres in field from which runoff will be collected ≈ 222 Acres

Will there be an existing reuse pit filled in or replaced by this system? Yes X No

Are there Wetlands on property or near VFTWRS site? Yes X No

Is there electricity available to the site? X Yes No. What type? 440 Voltage 3 Phase

Will water delivery to the VFTWRS be from more than one source? X Yes No.

If Yes, will both water sources deliver water to the field at the same time? X Yes No

Water Delivery to Field:

- Source 1 - Well 700 GPM (or) Surface Allocation CFS. Operating pressure @ normal flow psi (or) delivery head pressure feet. Values were estimated X (or) measured
- Source 2 - Well 700 GPM (or) Surface Allocation CFS. Operating pressure @ normal flow psi (or) delivery head pressure feet. Values were estimated X (or) measured

Existing Elevations :

- Top of Field (Head End)
- Lowest Elevation of Field 50.0
- Field Drain Elevation 50.0

System Layout Information

On location map and aerial photo, sketch or plot the location of the VFTWRS, return line and field(s) for which the return water will be used.

Location where VFTWRS return water will be used (list all that pertain):

- To the field from which runoff originated; with the return line attached to well or field mainline X Yes No.
 - If Yes, what is operating pressure in well or field mainline at the return line location under normal flow conditions?
 psi (or) feet of pressure head 1/ Butterfly valve will separate systems/pipelines.
- To the field from which runoff originated; the return line is NOT attached to the well or field mainline Yes No
- Different Field Yes X No

Area to be irrigated with VFTWRS:

- Field Number 1 ≈ 20+ Acres
- Field Number 2 Acres

Pipeline Information

- There is a inch diameter, existing return pipeline (buried, above ground), (or) 8 inch diameter new return pipeline planned, to the head end of field. The planned or existing pipeline: length 1,000 feet, material type PIP (PVC), pressure rating of pipe SDR 51.

Design Information**Design Elevations**

- Benchmark Elevation 50.0
- Top of VFTWRS elevation 54.0
- VFTWRS Bottom Steel Plate Elevation 44.0
- Other (Overflow, Culvert, etc.) 50.0 is flowline of road culvert
- Description: Upstream Flowlines of County Road Culvert directly east of the VFTWRS
- Elevation of Bottom Slots/Mesh 49.0
- Silt Basin Elevation (if any) _____

Design Information

- Proposed VFTWRS pump capacity 500 gpm.
- Pump capacity was based on the following (check one of the following): minimum 300 gpm _____, 1/3 of potential water delivery to field 1,400, Measured runoff _____ (attach documentation), Computer modeled runoff _____ (attach documentation)

Inlet Suction Pipe

- Inlet Suction Pipe Size 6 inches Wall Thickness 0.083 (inches) Minimum wall thickness for aluminum pipe shall be as follows: 4" diameter – 0.072", 5" diameter - 0.078", 6" diameter - 0.083".

Pump Total Dynamic Head (TDH) – (Attach pipe profile with plotted system HGL)

- Minimum operating pressure @ outlet of return pipeline 13 feet
 - Return pipeline friction and minor losses 13 feet
 - Elevation difference between pump elevation and return pipeline outlet (uphill "+", downhill "-") 6 feet
 - Vertical suction lift.- elevation difference between pump elevation and low level water surface 6 feet
 - Friction loss and minor losses in pump column 1.55 feet
- Σ= TDH = 39.6 feet

Net Positive Suction Head Available (NPSH_{available})

- Atmospheric pressure for mean sea elevation of 2,100 feet 31.5 feet
 - Minus vertical suction lift.- elevation difference between pump elevation and low level water surface (-) 6 feet
 - Minus friction loss and minor losses in pump column (-) 1.55 feet
 - Minus vapor pressure (-) 1.0 feet
 - Minus safety factor (-) 2 feet
- Σ= NPSH_{available} = 21.0 feet

Net Positive Suction Head Required (NPSH_{required})

The Net Positive Suction Head Required from the pump characteristic curves for the required flow rate is 21 feet. NPSH_{available} must always be equal to or larger than the Net Positive suction Head Required NPSH_{required}. If not, select a different pump or inlet suction pipe until the requirement is satisfied.

Horse Power Requirements

- Brake Horsepower = bhp = $\frac{\text{TDH (ft)} * Q \text{ (gpm)}}{3960 * \text{Eff} / 100}$ = $\frac{39.6 \text{ feet} * (500 \text{ gpm})}{3960 * 60 \% / 100}$ = 8.42 bhp

Eff = Pump Efficiency X Drive Efficiency (Assume drive efficiency = 100%) . Attach pump characteristic curve.

- Motor Horsepower = $\frac{\text{bhp}}{\text{Motor Efficiency}} = \frac{8.42}{88 \% / 100} = 9.57$ hp

If the motor efficiency is unknown assume 88%.

1.1.1 Appurtenances Needed

For VFTWRS only _____, For total return system including return pipeline X

Type	Size		Number		Location/Station	
	Planned	Checked	Planned	Checked	Planned	Checked
2 inch Air Relief						
Air Vac Valve	2"		1		0+00	
			1		10+00	
			1		18+00	
3 inch Pressure		Crack @				
Relief Valve	3"	38 psi	1		0+00	
8 inch Flowmeter	8"		1		0+00	
8 inch Checkvalve	8"		1		10+05	
8 inch Butterfly Valve	8"		1		18+00	
Irrigation Riser	12"		1		0+00	<u>2/</u>
			1		10+00	

Note – A totalizing flow measurement device is required on all VFTWRS installed.

Comments:

***1/ Butterfly valve will separate system/pipelines**

***2/ Optional dog leg "Z" pipe could be used instead of riser**

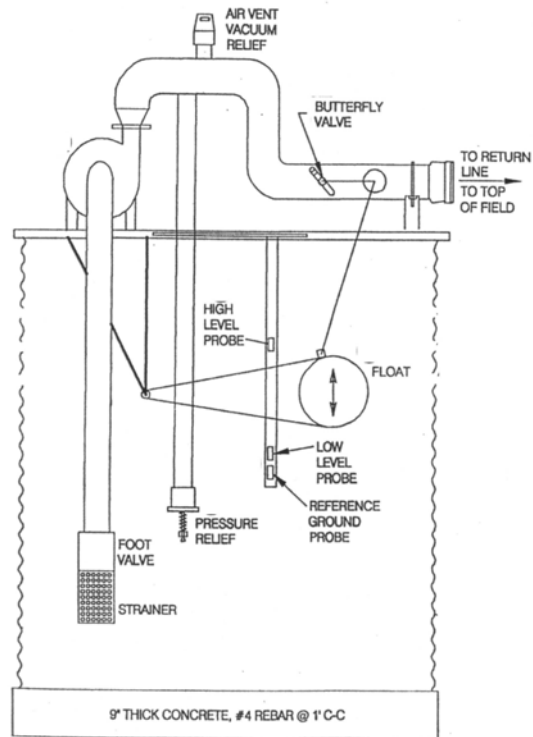
An Aermotor GF600 5.13" Trim pump was recommended by the manufacturer. This pump meets the discharge-head requirements of the system. NPSH_{required} is 9.5' which is less than the NPSH_{available} 21.0'.

NOTE -- Plan view and profile of system and return line not shown in this example.

Elevation 54.0
Top of VFTWRS

Elevation 49.0
Bottom of Slots/Mesh

Elevation 44.0
Bottom Plate or Top
Of Concrete Slab



Install Flow Measurement
Device as per installation
requirements.

VFTWRS

Location Map

Location of Practice

Legal NE 1/4

Section 26

Township 28N

Range 50N

